

INTERNATIONAL SEARCH REPORT

International Application No
PCT/DE2004/000815A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L23/544 H01L21/762

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
Y	US 6 306 755 B1 (ZHENG TAMMY) 23 October 2001 (2001-10-23) abstract; claim 1	1-19
Y	US 2002/088769 A1 (ANTAKI ROBERT ET AL) 11 July 2002 (2002-07-11) page 1, paragraphs 5,10; figures 1a-2b	1-19
Y	US 6 403 389 B1 (DUBEY ABHAY ET AL) 11 June 2002 (2002-06-11) figure 17b	1-19

☐ Further documents are listed in the continuation of box C☒ Patent family members are listed in annex

* Special categories of cited documents

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

Z document member of the same patent family

Date of the actual completion of the international search

26 October 2004

Date of mailing of the international search report

09/11/2004

Name and mailing address of the ISA

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6306755	B1	23-10-2001	NONE
US 2002088769	A1	11-07-2002	GB 2369187 A 22-05-2002 WO 0241388 A2 23-05-2002 EP 1340251 A2 03-09-2003
US 6403389	B1	11-06-2002	US 6057171 A 02-05-2000 TW 442887 B 23-06-2001 WO 9916107 A2 01-04-1999 US 6291254 B1 18-09-2001 US 6312963 B1 06-11-2001

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 11475p	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/DE2004/000815	International filing date (day/month/year) 19.04.2004	Priority date (day/month/year) 17.04.2003	
International Patent Classification (IPC) or national classification and IPC			
Applicant X-FAB SEMICONDUCTOR FOUNDRIES AG			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

- a. ☒ (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
- ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s))

_____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the report
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1 (b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-9 _____ as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-19 _____ received by this Authority on 18.05.2005 with telefax
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets 1/2, 2/2 _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to sequence listing (specify): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 1-9

because:

☐ the said international application, or the said claims Nos. _____
relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-9
are so unclear that no meaningful opinion could be formed (*specify*):

see supplemental sheet

☐ the claims, or said claims Nos. _____ are so inadequately supported
by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details.

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	10-19	YES
	Claims		NO
Inventive step (IS)	Claims	10-19	YES
	Claims		NO
Industrial applicability (IA)	Claims	10-19	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

1. This report makes reference to the following available prior art documents:

D1: US-B1-6 306 755 (ZHENG TAMMY) 23
October 2001 (2001-10-23)

D2: US 2002/088769 A1 (ANTAKI ROBERT ET AL)
11 July 2002 (2002-07-11)

D3: US-B1-6 403 389 (DUBEY ABHAY ET AL) 11
June 2002 (2002-06-11)

2. The subject matter of claim 10 appears to meet the PCT requirements with respect to novelty (PCT Article 33(2)) and inventive step (PCT Article 33(3)):

- 2.1 D1 (see the abstract) describes the simultaneous etching of functional structures and test structures that have the same dimensions, for the purpose of determining the etching endpoint. The features of claim 10, namely that
- the test structure consists of a row of islands surrounded by trenches of

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

various widths, and that

- the etching endpoint is determined by verifying the electrical throughput, are not disclosed in D1.

2.2 D2 (see figures 1a-2b, and paragraphs 5 and 10) discloses a method for evaluating etching processes by means of a row of holes of increasing width. This document discloses neither the etching of test structures at the same time as functional structures nor the determination of etching endpoints by measuring the electrical throughput.

2.3 D3 (see figure 17b and the corresponding text) discloses resistance measurements in test structures for the purpose of determining etching endpoints. This document neither mentions nor renders obvious the simultaneous etching of functional structures and a row of islands surrounded by trenches of different widths.

2.4 Even if a person skilled in the art combined D1, D2 and D3, he would not arrive at the subject matter of claim 10, since none of these documents renders obvious the concept of the simultaneous etching of functional structures and a row of islands surrounded by trenches of different widths.

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Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

3. Consequently, the subject matter of claims 11-19, which are dependent on claim 10, is likewise regarded as novel (PCT Article 33(2)) and inventive (PCT Article 33(3)).

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box III

1. Claim 1 lacks clarity (PCT Article 6) because it defines an entirely abstract product that is not reproducible, namely a "test structure". The descriptive features of the claim, to the extent that they can even be understood, lead the reader to imagine a method for verifying etchings of separation trenches wherein a test geometry is also etched, but it is entirely unclear what parts thereof should be regarded as the claimed, static product "test structure", and at what point during the process. Claim 1 creates legal uncertainty with respect to the scope of protection.
2. Claims 2 and 3 do not contain all of the essential features that are necessary for carrying out the invention (see points 2.1 and 2.2). Since these claims and claim 10 were drafted as separate, independent claims but actually appear to refer to one and the same subject matter and to differ from each other only by different definitions of the subject matter for which protection is sought, an examination of claims 2 and 3, which lack clarity, with respect to novelty and inventive step would not appear to be meaningful.

Supplemental Box

- 2.1 Claim 2 lacks clarity (PCT Article 6) because the meaning of a whole row of test islands having the same dimensions and geometry is incomprehensible. The claim appears to lack essential features that detail the dimensions of the test islands. It also lacks essential features that describe the insulation trench etchings and, in particular, features that establish a relationship between said etchings and the test islands and their dimensions.
3. It is not clear what the feature in claim 3 *"electrical throughput is measured, in particular successively in each case, between a semiconductor island (A,B) and a disc area...surrounding...the semiconductor island"* describes, namely whether all of the areas are measured successively, or whether several measurements are carried out successively in a particular area. In any case, it is clear from the application that both would be essential features. Claim 3 does not appear to contain all of the essential features necessary for carrying out the invention.